

# *Powder River Basin CORE-CM: Advancing Strategies for Carbon Ore, Rare Earth Element, and Critical Mineral Resource Development in the Nation's Largest Coal Producing Basin*

DE-FE0032048

USEA CONSENSUS Webinar  
December 2, 2021

Project Lead:

Erin Phillips, Senior Research Scientist  
University of Wyoming School of Energy Resources  
ephilli8@uwyo.edu

Task Lead:

Scott Quillinan, Senior Director for Research  
University of Wyoming School of Energy Resources  
scottyq@uwyo.edu



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Energy Resources

# Acknowledgement and Disclaimer

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# Vision and Mission

## Vision

*To provide an economic benefit to the Powder River Basin of Wyoming and Montana by stimulating new carbon ore, rare earth element, and critical mineral resource development centered around the nation's largest coal mines*

## Mission

*To leverage the highly trained workforce, existing coal technologies, energy infrastructure, and wide public acceptance of energy technology in the Powder River Basin to bring together a committed network of stakeholders and to establish strategic plans to maximize the development potential around all parts of the carbon ore, rare earth element, and critical mineral value chains*

21	<b>Sc</b>
39	<b>Y</b>



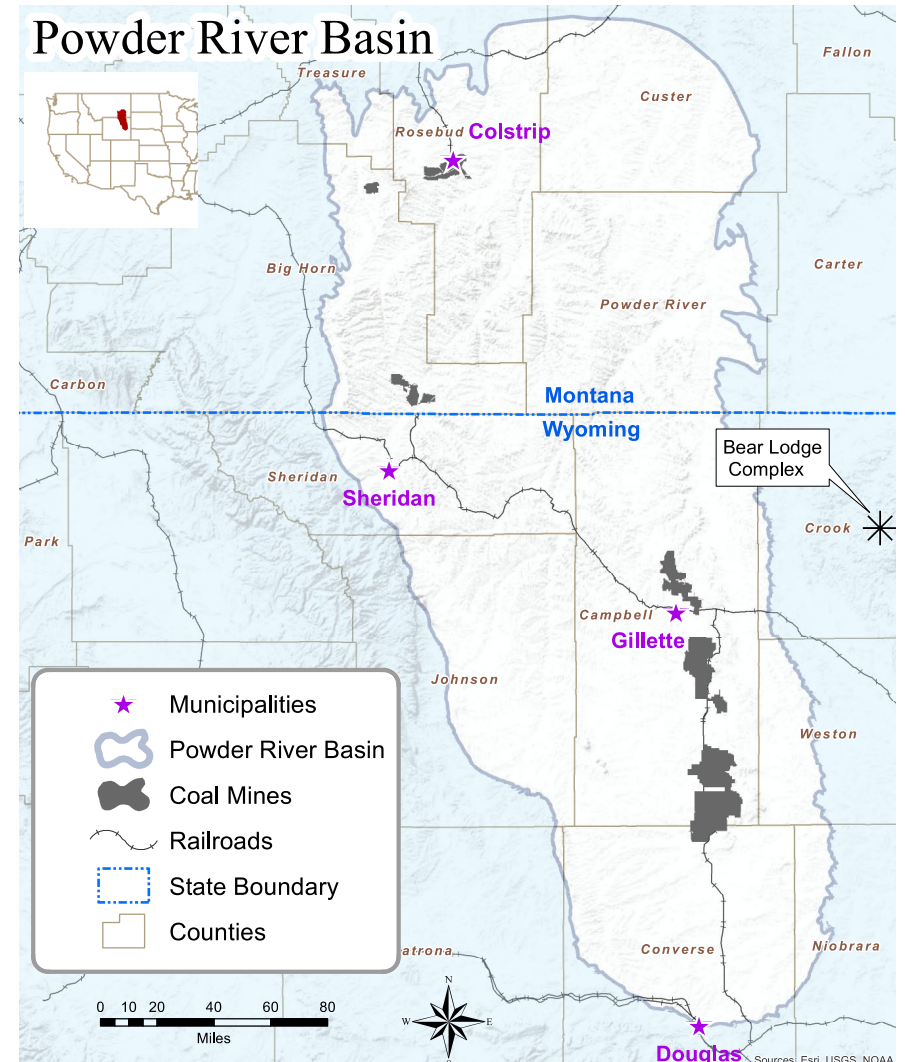
Carbon Ore, Rare Earth and Critical Minerals (CORE-CM) Initiative

*Powder River Basin*

57	58	59	60	61	62	63	64	65	66	67	68	69	70	71
<b>La</b>	<b>Ce</b>	<b>Pr</b>	<b>Nd</b>	<b>Pm</b>	<b>Sm</b>	<b>Eu</b>	<b>Gd</b>	<b>Tb</b>	<b>Dy</b>	<b>Ho</b>	<b>Er</b>	<b>Tm</b>	<b>Yb</b>	<b>Lu</b>

# The *Where*

- The Powder River Basin of Wyoming and Montana contains significant resources of low-sulfur, low-ash, subbituminous coal
- Surface mining techniques and thick coal seams (>50 ft)
- Wyoming coal is shipped to power plants in 29 states and utilized in 113 coal-fired electricity generation units (eia.gov)
- The Bear Lodge Complex is one of the largest unproduced conventional rare earth element deposits in the U.S.
- Bentonite, oil and gas, and uranium mining



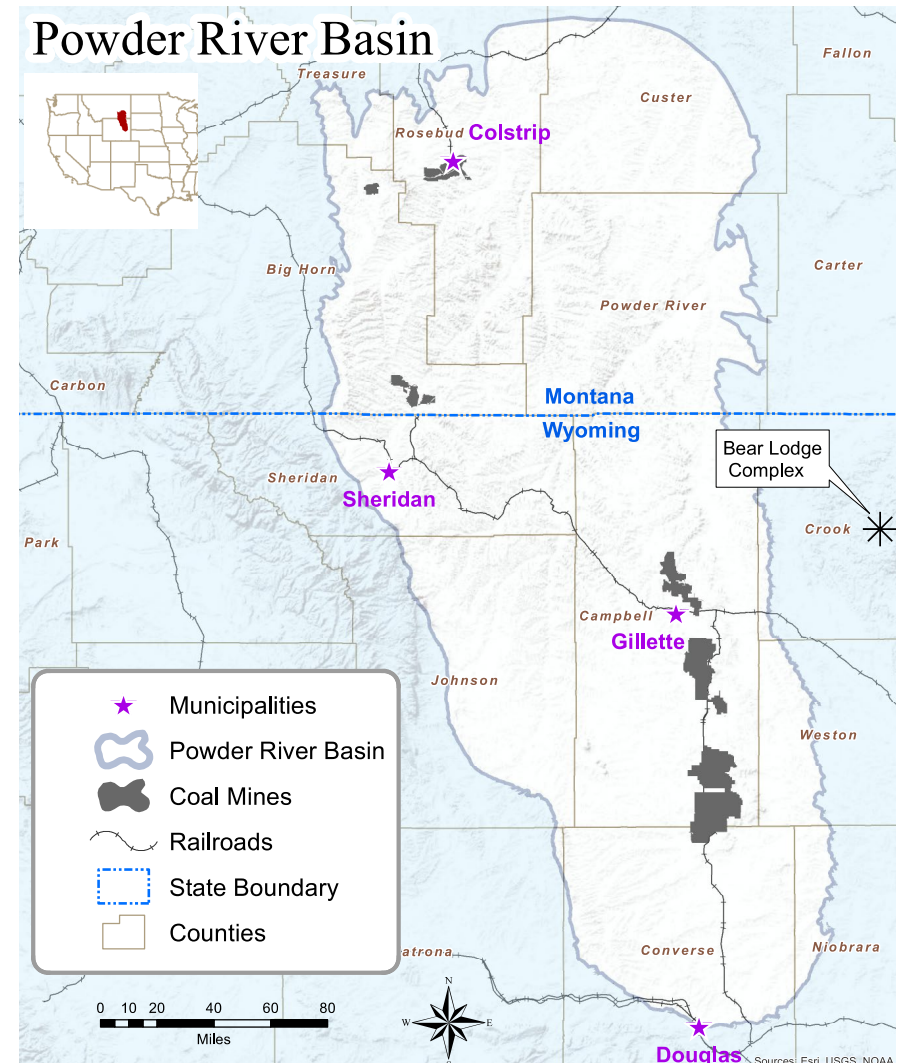
# The *Where* (continued)

## Existing technology innovation centers

- The Wyoming Innovation Center (WyIC)
- The UW School of Energy Resources Center for Carbon Capture and Conversion (CCCC)
- Ramaco's Carbon Advanced Materials Center (iCAM)
- The Wyoming Integrated Test Center (ITC)

## Goals for technology innovation centers

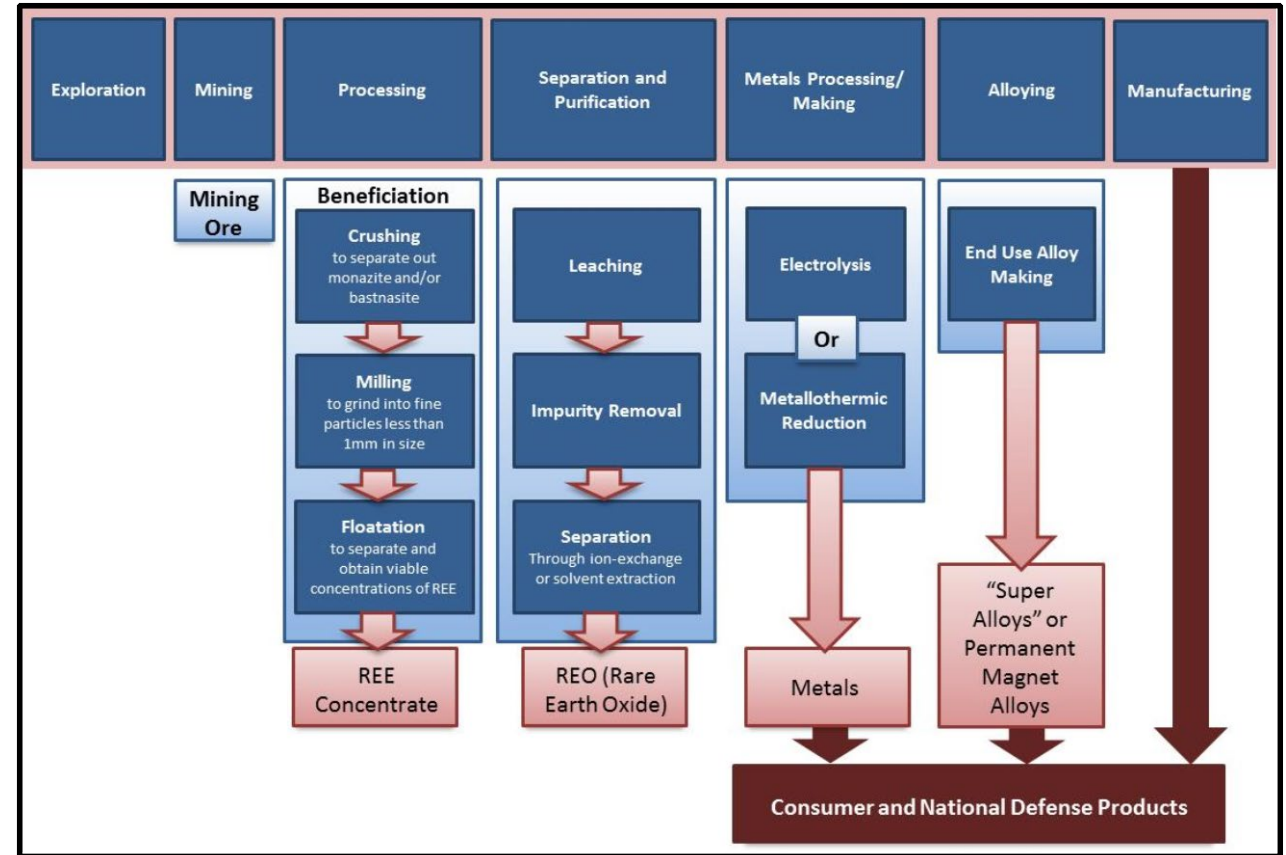
- Support existing technology innovation centers
- Identify strengths and needs in existing technology innovation center infrastructure
- Propose strategies for future technology innovation centers



# The *What*

## Key Pieces

- Resource assessment
  - Primary resources
  - Waste streams
- Infrastructure, industry, and business assessment
- Technology assessment
- Outreach and education



Source: US DOE Report on Rare Earth Elements from Coal and Coal Byproducts; Report to Congress, January 2017

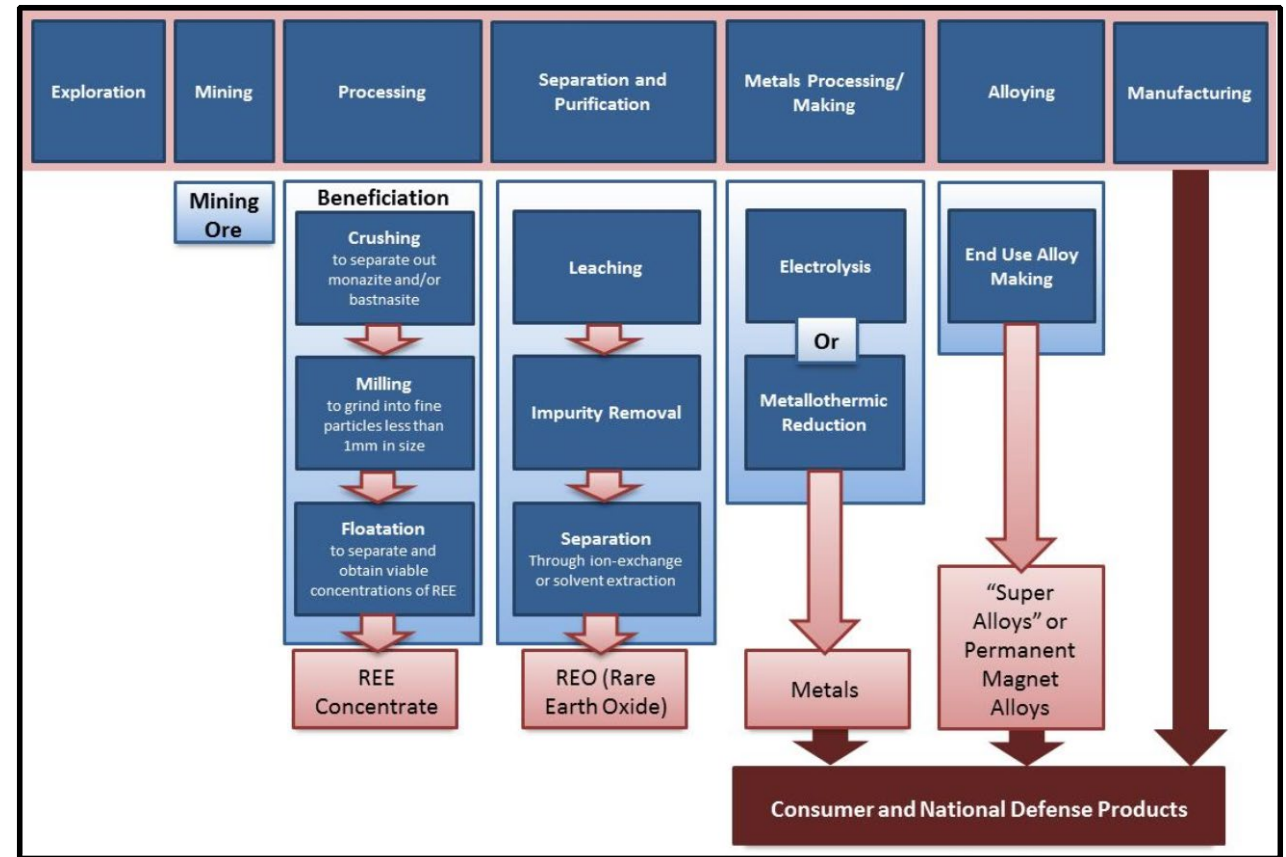
# The *What* (continued)

## Primary goals

- Promote workforce development
- Connect stakeholders
- Compile existing data and identify gaps
- Complete strategic plans that outline pathways to CORE-CM resource development

## Vision for Technology Innovation Centers

- Leverage strengths of existing centers
- Identify opportunities for new centers across the CORE-CM value chain



Source: US DOE Report on Rare Earth Elements from Coal and Coal Byproducts; Report to Congress, January 2017

# The Who





# The *Why*

## **Why is the Powder River Basin CORE-CM project important to the region?**

- The Powder River Basin is a traditionally fossil-fuel producing region
- Energy infrastructure and workforce already in place to support new CORE-CM development

## **Benefits to the region**

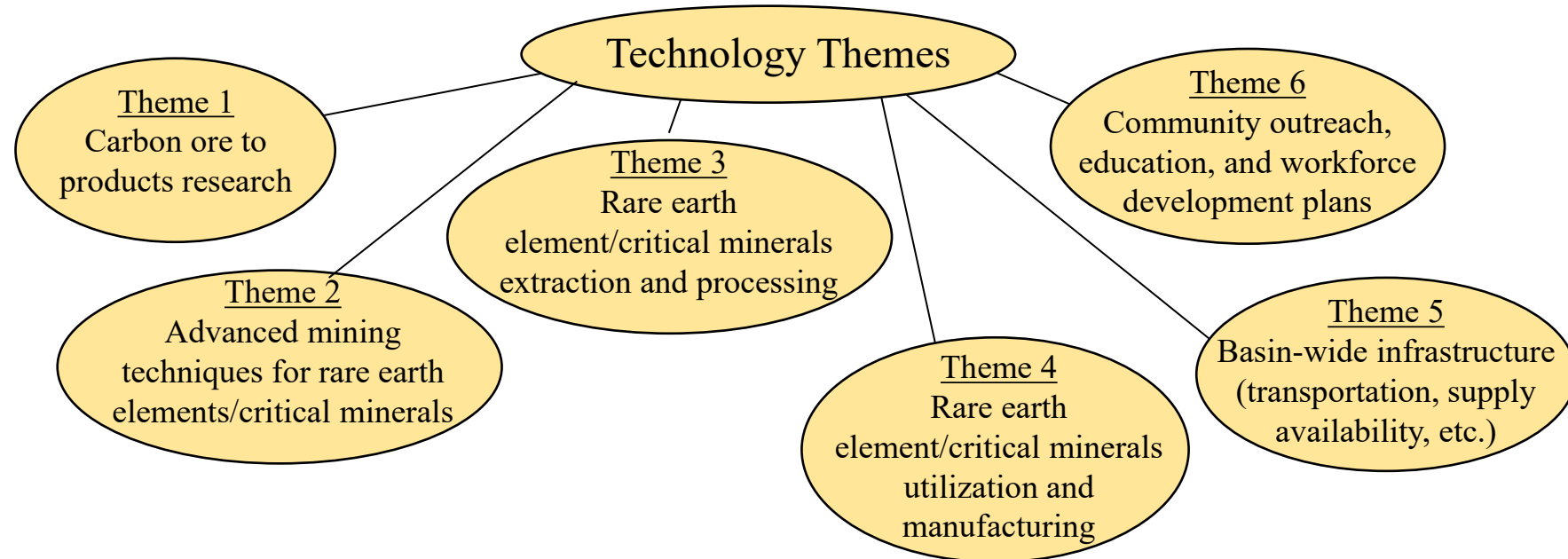
- Sustainable workforce opportunities
- Economic diversification
- Environmental and social justice considerations for communities in transition



# The *How*

## Stakeholder Engagement

- Annual forums (tentatively planned for spring 2022 and 2023)
- Technology transfer workshops (tentatively planned for winter 2022 and 2023)



# The *How* (continued)

## Stakeholder Engagement

*Resources that will be developed during the project*

- Makerspace Access Pass (MAP) workforce training and educational content
- Data-sharing infrastructure and webpage  
*<https://www.uwyo.edu/cegr/research-projects/core-cm-prb.html>*
- Outreach programs
- Project update emails and announcements



# The *How* (continued)

## **Environmental Justice**

- *Summary of Environmental Justice Considerations* – UW School of Energy Resources Center for Energy Regulation and Policy Analysis

## **Environmental, Social, and Governance**

- *Summary of Economic Revitalization and Job Creation Outcomes*
- *Environmental, Safety, and Health Analysis for Products Proposed to be Manufactured From CORE-CM Resources*
- Collaboration with wide network of project partners and stakeholders from Powder River Basin communities

## **Standards Development**

- *Coordination with International Organization for Standardization (ISO)* – UW School of Energy Resources and other project partners



# The *How* (continued)

## Progress to date

- Stakeholder kickoff October 14, 2021
- Stakeholder informational survey
- Department of Energy kickoff October 27, 2021
- Rare Earth Element and Critical Mineral Development Webinar November 15, 2021
- Task organizational meetings and data sharing platforms established
- Initial literature searches and compilation of existing data
- Continued stakeholder outreach

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Stakeholder Kickoff Meeting  
October 14, 2021

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Department of Energy Kickoff Meeting  
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LIVE WEBINAR

RARE EARTH ELEMENT AND CRITICAL MINERAL DEVELOPMENT IN WYOMING

MONDAY, NOVEMBER 15, 2021  
12:00 PM



Randy Scott  
Rare Element Resources

Thomas Tarka  
National Energy Technology Laboratory

Holly Krutka, SER Executive Director  
presenting for Melissa Firestone  
Center for Energy Regulation & Policy Analysis

Jada Garofalo  
Center for Energy Regulation & Policy Analysis

Erin Phillips  
Center for Economic Geology Research

MODERATED BY:  
Scott Cullinan  
School of Energy Resources



# Challenges and Opportunities

## Challenges

- Restrictions on travel
- Reaching and engaging all interested stakeholders
- Integrating large amounts of data on CORE-CM resources, technology, and basinal infrastructure

## Opportunities

- Connections between stakeholders across the value chain
- Workforce and economic development programs
- Economic diversification for communities in transition
- An integrated perspective to basinwide CORE-CM development

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